

WHAT IS CLAIMED IS:

1. A compound comprising a plurality of linked nucleosides, wherein:

each nucleoside includes a ~~ribofuranosyl~~ ^{pentofuranosyl} sugar portion and a base portion; and

at least one of said nucleosides bears at a 2'-O-position, a 3'-O-position, or a 5'-O-position a substituent having formula:



where:

R_A is alkyl having from 1 to about 10 carbon atoms or $(CH_2-CH_2-Q)_x$;

R_{1a} and R_{1b} , independently, are H, R_2 , or an amine protecting group or have formula $C(X)-R_2$, $C(X)-R_A-R_2$, $C(X)-Q-R_A-R_2$, $C(X)-Q-R_2$; and

R_2 is a steroid molecule, a reporter molecule, a lipophilic molecule, a reporter enzyme, a peptide, a protein, or has formula $-Q-(CH_2CH_2-Q)_x-R_3$;

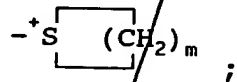
X is O or S;

each Q is, independently, is NH, O, or S;

x is 1 to about 200;

R_3 is H, R_A , $C(O)OH$, $C(O)OR_A$, $C(O)R_4$, R_A-N_3 , or R_A-NH_2 ;

R_4 is Cl, Br, I, SO_2R_5 or has structure:



m is 2 to 7; and

R_5 alkyl having 1 to about 10 carbon atoms.

2. The compound of claim 1 wherein more than one of said nucleosides bear said substituent at a 2'-O-position, a 3'-O-position, or a 5'-O-position.

3. The compound of claim 1 wherein R_A is $(CH_2)_n$ where n is an integer from 1 to about 10.

08/117,313

Cook et al.

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4. The compound of claim 3 wherein n is 6.
5. The compound of claim 1 wherein said R_{1a} and R_{1b} , together, are phthalimido.
6. The compound of claim 1 wherein R_{1a} is H and R_{1b} is $C(O)-(CH_2)_n-R_2$ where n is an integer from 1 to about 10.
7. The compound of claim 1 wherein R_{1a} is H and R_{1b} is R_2 .
8. The compound of claim 1 wherein R_{1a} is H and R_{1b} is $C(O)-O-R_2$.
9. The compound of claim 1 wherein R_{1a} and R_{1b} both are alkyl.
10. The compound of claim 1 wherein R_{1a} is H and R_{1b} is $C(O)-(CH_2)_n-R_2$ where n is an integer from 1 to about 10.
11. The compound of claim 10 wherein R_2 has formula $-(CH_2)_5-NH-$.
12. The compound of claim 1 wherein R_{1a} is H and R_{1b} is $C(S)-NH-R_2$.
13. The compound of claim 1 wherein R_2 includes pyrene, fluorescein, dinitrophenyl, cholesterol, acridine.
14. The compound of claim 1 wherein R_{1a} is H and R_{1b} is $C(O)-R_2$.
15. The compound of claim 14 wherein R_2 has formula $-O-(CH_2CH_2-O-)_x-R_3$.

16. A nucleoside comprising a ^{pentofuranosyl}~~ribofuranosyl~~ sugar portion and a base portion, wherein said nucleoside bears at a 2'-O-position, a 3'-O-position, or a 5'-O-position a substituent having ^{the} formula:



where:

R_A is alkyl having from 1 to about 10 carbon atoms;

R_{1a} and R_{1b} , independently, are H, R_2 , or an amine protecting group or have formula $C(X)-R_2$, $C(X)-R_A-R_2$, $C(X)-Q-R_A-R_2$, $C(X)-Q-R_2$; and

R_2 is a steroid molecule, a reporter molecule, a lipophilic molecule, a reporter enzyme, a peptide, a protein, or has formula $-Q-(CH_2CH_2-Q)_x-R_3$;

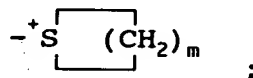
X is O or S;

each Q is, independently, is NH, O, or S;

x is 1 to about 200;

R_3 is H, R_A , $C(O)OH$, $C(O)OR_A$, $C(O)R_4$, R_A-N_3 , or R_A-NH_2 ; and

R_4 is Cl, Br, I, SO_2R_5 or has structure:



m is 2 to 7; and

R_5 alkyl having 1 to about 10 carbon atoms.

17. The ^{nucleoside}~~compound~~ of claim 16 wherein R_A is $(CH_2)_n$ where n is an integer from 1 to about 10.

18. The ^{nucleoside}~~compound~~ of claim 16 wherein n is 6.

19. The ^{nucleoside}~~compound~~ of claim 16 wherein said R_{1a} and R_{1b} , together, are phthalimido.

20. The ^{nucleoside}~~compound~~ of claim 16 wherein R_{1a} is H and R_{1b} is $C(O)-(CH_2)_n-R_2$ where n is an integer from 1 to about 10.

c 21. The ^{nucleoside}~~compound~~ of claim 16 wherein R_{1a} is H and R_{1b} is R_2 .

c 22. The ^{nucleoside}~~compound~~ of claim 16 wherein R_{1a} is H and R_{1b} is $C(O)-O-R_2$.

c 23. The ^{nucleoside}~~compound~~ of claim 16 wherein R_{1a} and R_{1b} both are alkyl.

c 24. The ^{nucleoside}~~compound~~ of claim 16 wherein R_{1a} is H and R_{1b} is $C(O)-(CH_2)_n-R_2$ where n is an integer from 1 to about 10.

c 25. The ^{nucleoside}~~compound~~ of claim 24 wherein R_2 has formula $-(CH_2)_5-NH-$.

c 26. The ^{nucleoside}~~compound~~ of claim 16 wherein R_{1a} is H and R_{1b} is $C(S)-NH-R_2$.

c 27. The ^{nucleoside}~~compound~~ of claim 16 wherein R_2 includes pyrene, fluorescein, dinitrophenyl, cholesterol, acridine.

c 28. The ^{nucleoside}~~compound~~ of claim 16 wherein R_{1a} is H and R_{1b} is $C(O)-R_2$.

c 29. The ^{nucleoside}~~compound~~ of claim 28 wherein R_2 has formula $-O-(CH_2CH_2-O-)_x-R_3$.

30. A method for modulating the production of a protein by an organism comprising contacting an organism with a compound of claim 1.

31. A method for modulating the production of a protein by an organism comprising contacting an organism with a compound of claim 16.

32. A method of treating an animal having a disease characterized by undesired production of protein comprising contacting said animal with a compound of claim 1.

33. A method of treating an animal having a disease characterized by undesired production of protein comprising contacting said animal with a compound of claim 16.

34. A method for detecting the presence or absence of an RNA in a biological sample suspected of containing said RNA comprising contacting said sample with a compound of claim 1.

35. A method for detecting the presence or absence of an RNA in a biological sample suspected of containing said RNA comprising contacting said sample with a compound of claim 16.